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Comparative study of visual care in Forest Grove and McMinville high schools for the years 1957 and 1974

Abstract

Comparative study of visual care in Forest Grove and McMinville high schools for the years 1957 and 1974

Degree Type

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Committee Chair

Earle L. Hunter

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COMPARATIVE STUDY OF VISUAL CARE IN FOREST GROVE
AND MCMINNVILLE HIGH SCHOOLS
FOR THE YEARS 1957 AND 1974

PRESENTED TO THE FACULTY OF PACIFIC UNIVERSITY COLLEGE
OF OPTOMETRY IN PARTIAL FULFILLMENT OF THE DEGREE OF
DOCTOR OF OPTOMETRY

BY
KIT CARMLENCKE
JON D. THAYER

MAY 1974

PRESENTED TO THE FACULTY OF PACIFIC UNIVERSITY COLLEGE
OF OPTOMETRY IN PARTIAL FULFILLMENT OF THE DEGREE OF
DOCTOR OF OPTOMETRY

Earle L. Hunter O.D.
EARLE L. HUNTER
THESIS ADVISOR

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We hereby express our appreciation for the cooperation of Mr. Paul of McMinnville High School and Mr. Gamble of Forest Grove High School for securing the information essential for this study.

In addition we express our appreciation to the students and teachers of Forest Grove and McMinnville High Schools who participated in securing the raw data for our study.

We are also indebted to Dr. Earle Hunter, member of the faculty of Pacific University College of Optometry, who served as our advisor on this project.

INTRODUCTION

The Problem

In this study we have attempted to compare the level of visual care received by the high school populations of two communities, Forest Grove and McMinnville. These communities are similar in population and industry, and are both college towns. The basic difference between these communities, concerning visual care is that McMinnville is served by private practitioners, whereas Forest Grove is served by both private practitioners and an optometric clinic.

Areas of the Problem Studied

In 1957 Adams and Charbonneau made a similar comparative study of the visual care received in Forest Grove and McMinnville. At that time they established the following four areas of the problem to be studied. These are:

1. The number of persons who had received either optometric or medical care and its recency.
2. The number of persons who had received visual training and whether this was medical or optometric.
3. The number of persons prescribed an Rx and whether this was a full time Rx or a part time one.
4. The number in Forest Grove who avail themselves of the services of the Pacific University Optometric Clinic.

By studying essentially the same areas as Adams and Charbonneau, and asking similar questions we hope to accomplish the following two basic goals: (1) first we will have a statistical comparison of the visual care of these two communities, but also (2) we will be able

to evaluate any changes which have occurred in the delivery of visual care which has occurred in these two communities in the past 15 years.

Since similar questions were asked in the two surveys all graphs and tables will present results from both 1957 and 1974. In this way the reader can better appreciate any changes in visual delivery in the past 15 years.

Statistical Method Employed

The standard Z score has been employed to evaluate the percentages of two unequal populations. This allows us to obtain a critical ratio which we can compare to the 5% level of confidence. If any critical ratio is below this 5% level of confidence (below 1.96) we must assume that the percentages were not statistically significant. On the other hand, if the critical ratio is above this 5% level of confidence we would have to reject our null hypothesis, and assume that the percentages are statistically significant.

Procedure in Securing the Data

Included on the next page is a modified copy of the Adams-Charbonneau questionnaire which we presented to the high school students of each community. An explanation sheet was delivered to each classroom teacher whose class participated in our study.

The teacher was to explain each question before it was answered.

Three hundred questionnaires were distributed in each high school with a 91% return in Forest Grove and a 78% return in McMinnville.

In keeping with the original study in 1957, four additional questions were asked on the individuals' visual care questionnaire. These were asked again in an attempt to define the group as to class, age, and social status.

VISUAL CARE QUESTIONNAIRE

1. Age _____
2. Class _____
3. Father's occupation _____
4. Mother's occupation _____
5. Have you ever had a visual examination? Yes No
6. When was your last visual examination? 1 year Yes No
2 years Yes No
3 years Yes ☒ No
4 years Yes No
More Yes No
7. Was last visual examination medical? Yes No
8. Was last visual examination optometric? Yes No
9. Are your glasses to be worn all the time? Yes No
10. Are your glasses for near work only? Yes No
11. Do you have bifocal lenses? Yes No
12. Have you ever had visual training? Yes No
13. Was the visual training optometric? Yes No
14. Was the visual training medical? Yes No
15. Was your visual care from the
PACIFIC UNIVERSITY OPTOMETRIC CLINIC? Yes No

THE PURPOSE OF THIS QUESTIONNAIRE IS TO GATHER DATA WHICH WILL BE USED AS A COMPARATIVE STUDY OF THE VISUAL CARE AFFORDED BY PACIFIC UNIVERSITY'S OPTOMETRIC CLINIC IN FOREST GROVE AND THE VISUAL CARE AFFORDED BY PRIVATE PRACTITIONERS IN A COMPARABLE COMMUNITY.

EXPLANATION SHEET FOR QUESTIONNAIRE ON VISUAL CARE

1. Age: (Pupil's age on last birthday in years)
2. Class: (Class in high school - freshman, sophomore etc.)
3. Father's occupation: (If employed, give occupation. If unemployed, disabled etc. please state.)
4. Mother's occupation: (If she does not work away from home, list as housewife. If she works out of the home, give occupation.)
5. Have you ever had a visual examination? (This refers to a professional examination of vision by a doctor - not a screening test or an acuity check at a school.)
6. When was last visual examination? (This refers to a professional examination of vision by a doctor - not a screening test or an acuity check at school.)
7. Was last visual examination medical? (Was it performed by a member of the medical profession: General practitioner, ophthalmologist, eye, ear, nose and throat specialist.)
8. Was last visual examination optometric? (Was it performed by an optometrist (a specialist in vision) who practices without the use of drugs and drops.)
9. Are your glasses to be worn all the time? (Was pupil instructed by doctor to wear glasses at all times.)
10. Are your glasses to be worn for near work only? (Was pupil instructed to wear glasses only when doing close work such as desk work, reading, sewing, etc.)
11. Do you have bifocal lenses? (Bifocal lenses - are glasses which have two portions whose focal powers differ from each other.)
12. Have you ever had visual training? (Visual training (orthoptics) is the use of eye exercises to alleviate discomfort and correct visual disturbances.)
13. Was the visual training optometric? (Was it performed by an optometric doctor or by an assistant under his supervision?)
14. Was the visual training medical? (Was it performed by a medical doctor or by an assistant under his supervision?)
15. Was your visual care from the PACIFIC UNIVERSITY OPTOMETRIC CLINIC? (Visual care includes both visual training and the prescribing of glasses. The clinic referred to is operated by the Optometry School at Pacific University in Forest Grove.)

CLASS	NO.	AGE	PU.	YEARS					MED OPT	FULL TIME	NEAR ONLY	BIFOC RX	NO RX	VT	MED OPT
				1	2	3	4	MORE							
SOPH WITH EXAM	Yr. 57	105	15.35	52	59	13	15	8	10	14/91	49	9		48	24 1/23
	Yr. 74	72	15.41	16	32	14	6	6	14	13/59	24	6	7	35	14 0/14
SOPH. WITHOUT EXAM	Yr. 57	47	15.42												
	Yr. 74	15	15.45												
JUNIOR WITH EXAM	Yr. 57	74	16.30	26	38	13	8	5	10	8/66	29	20		25	17 0/17
	Yr. 74	65	16.44	20	31	9	7	7	11	11/54	16	12	10	27	11 1/10
JUNIOR WITHOUT EXAM	Yr. 57	41	16.22												
	Yr. 74	27	16.59												
SENIOR WITH EXAM	Yr. 57	85	17.30	32	46	17	7	5	10	18/67	29	12		44	17 0/17
	Yr. 74	80	17.56	20	43	11	6	5	15	14/66	33	8	13	26	15 0/15
SENIOR WITHOUT EXAM	Yr. 57	29	17.38												
	Yr. 74	15	17.66												
TOTALS	Yr.	380		140	143	43	30	18	30	40/224	107	41		117	58 1/57
	Yr.	274		56	106	34	20	18	40	38/179	73	36	30	88	40 1/39

FOREST GROVE THESIS YEAR 1957

DATA TABLE NO. 1

FOREST GROVE THESIS YEAR 1974

CLASS	NO.	AGE	PU.	YEARS					RED OPT	FULL TIME	NEAR ONLY	BIFOCAL RX	NO RX	VT	RED OPT
				1	2	3	4	MORE							
Yr. 57	93	15.42	3	60	11	7	7	8	25/68	36	22		35	13	2/11
SOPH. WITH EXAM															
Yr. 74	76	15.68	0	31	14	4	5	22	37/39	21	7	0	48	6	1/5
Yr. 57	27	15.41													
SOPH. WITHOUT EXAM															
Yr. 74	8	15.62													
Yr. 57	30	16.50	0	13	5	4	1	7	10/20	11	4		15	3	0/3
JUNIOR WITH EXAM															
Yr. 74	61	16.93	1	34	11	6	4	6	37/24	15	8	1	51	4	3/1
Yr. 57	7	16.00													
JUNIOR WITHOUT EXAM															
Yr. 74	14	17.00													
Yr. 57	28	17.25	0	18	2	4	1	3	7/21	12	4		12	3	0/3
SENIOR WITH EXAM															
Yr. 74	57	17.63	0	30	13	4	3	7	35/22	12	3	1	41	4	3/1
Yr. 57	10	17.20													
SENIOR WITHOUT EXAM															
Yr. 74	19	17.84													
Yr. 57	195		3	91	18	15	9	18	42/109	48	30		62	19	2/17
TOTALS															
Yr. 74	235		1	95	38	14	12	35	109/85	48	18	2	140	14	7/7

MCMINNVILLE THESIS YEAR 1957

DATA TABLE NO. 2

MCMINNVILLE THESIS YEAR 1974

FINDINGS

Question #1 Age

The mean age for those students from Forest Grove who participated in our survey was 16.51 years. While the mean age for the McMinnville students was 16.78 years.

Table 3 on the next page will give the reader a complete break down on the age of students in both the 1957 survey and the 1974 survey.

TABLE # 3

QUESTION # 1 AGE

		13	14	15	16	17	18	19
SENIOR WITH EXAM	Yr. 57	—	—	—	1	60	21	3
	Yr. 74	—	—	—	1	37	38	4
SENIOR WITHOUT EXAM	Yr. 57	—	—	—	1	18	9	1
	Yr. 74	—	—	—	—	6	8	1
JUNIOR WITH EXAM	Yr. 57	—	—	1	53	18	2	—
	Yr. 74	—	—	—	38	25	2	—
JUNIOR WITHOUT EXAM	Yr. 57	—	—	4	25	11	1	—
	Yr. 74	—	—	—	13	12	2	—
SOPH. WITH EXAM	Yr. 57	—	1	69	33	2	—	—
	Yr. 74	—	—	44	26	2	—	—
SOPH. WITHOUT EXAM	Yr. 57	—	—	29	16	2	—	—
	Yr. 74	—	—	8	7	—	—	—

FOREST GROVE

		13	14	15	16	17	18	19
SENIOR WITH EXAM	Yr. 57	—	—	—	—	21	7	—
	Yr. 74	—	—	—	—	13	30	5
SENIOR WITHOUT EXAM	Yr. 57	—	—	—	—	6	3	—
	Yr. 74	—	—	—	—	3	14	2
JUNIOR WITH EXAM	Yr. 57	—	—	1	16	10	3	—
	Yr. 74	—	—	—	9	47	5	—
JUNIOR WITHOUT EXAM	Yr. 57	—	—	—	7	—	—	—
	Yr. 74	—	—	—	2	10	2	—
SOPH. WITH EXAM	Yr. 57	—	—	62	24	6	1	—
	Yr. 74	—	—	32	36	8	—	—
SOPH. WITHOUT EXAM	Yr. 57	—	1	17	7	1	1	—
	Yr. 74	—	—	3	5	—	—	—

MCMINNVILLE

Question #2

What is your class in school?

This question was included in order to group our data for each class. Three classes are noted in our survey: sophomore, junior, and senior. These three divisions were separated on the basis of either having had or not having had a previous visual examination.

Questions #3 and #4

3. What is your father's occupation?

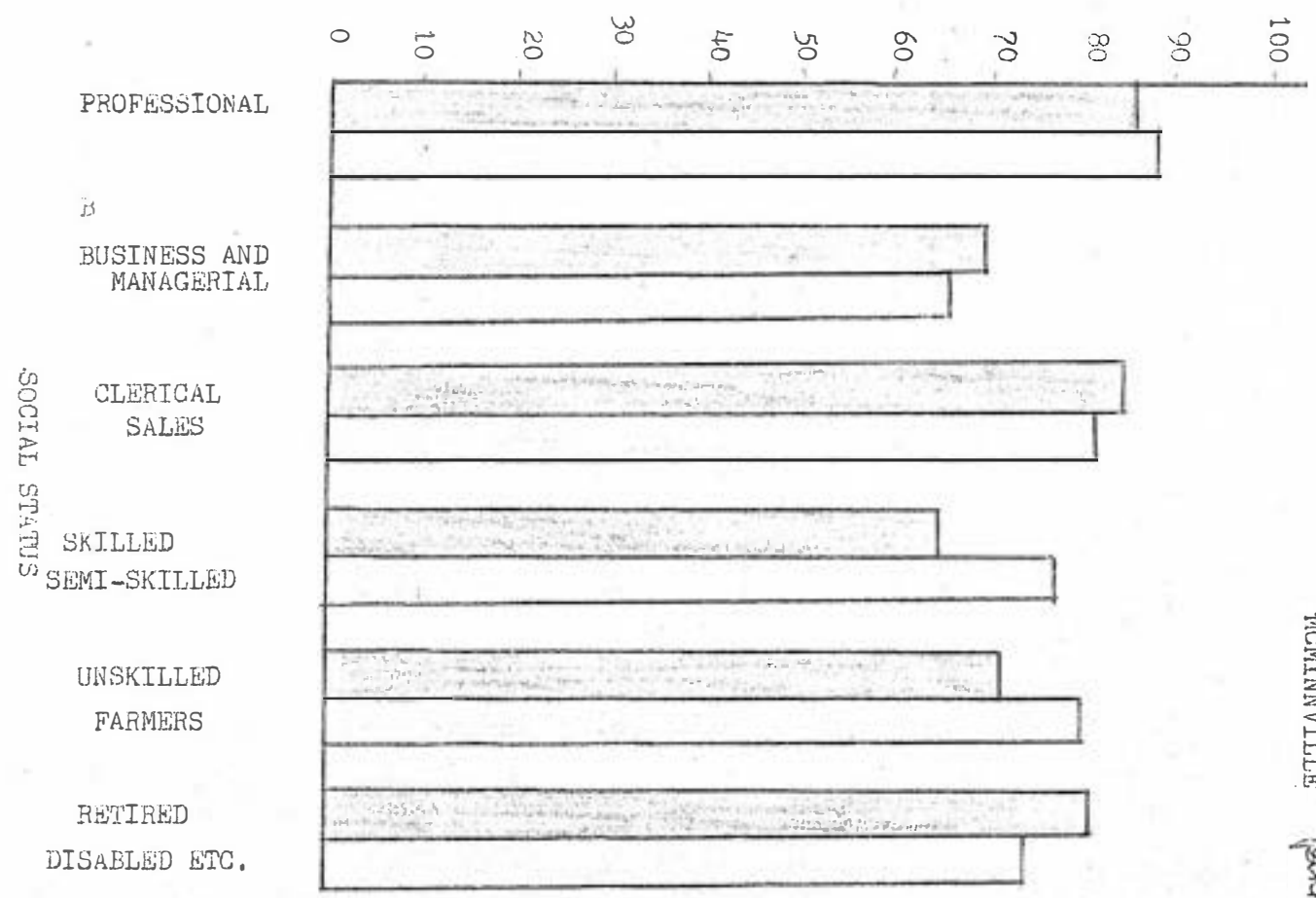
4. What is your mother's occupation?

This question was asked to make it possible to determine if position in society was a determining factor as far as visual care is concerned.¹ Graph #1 shows the respective percentages of children with visual examinations for each of these six groups.

GRAPH # 1
 THESIS 1957

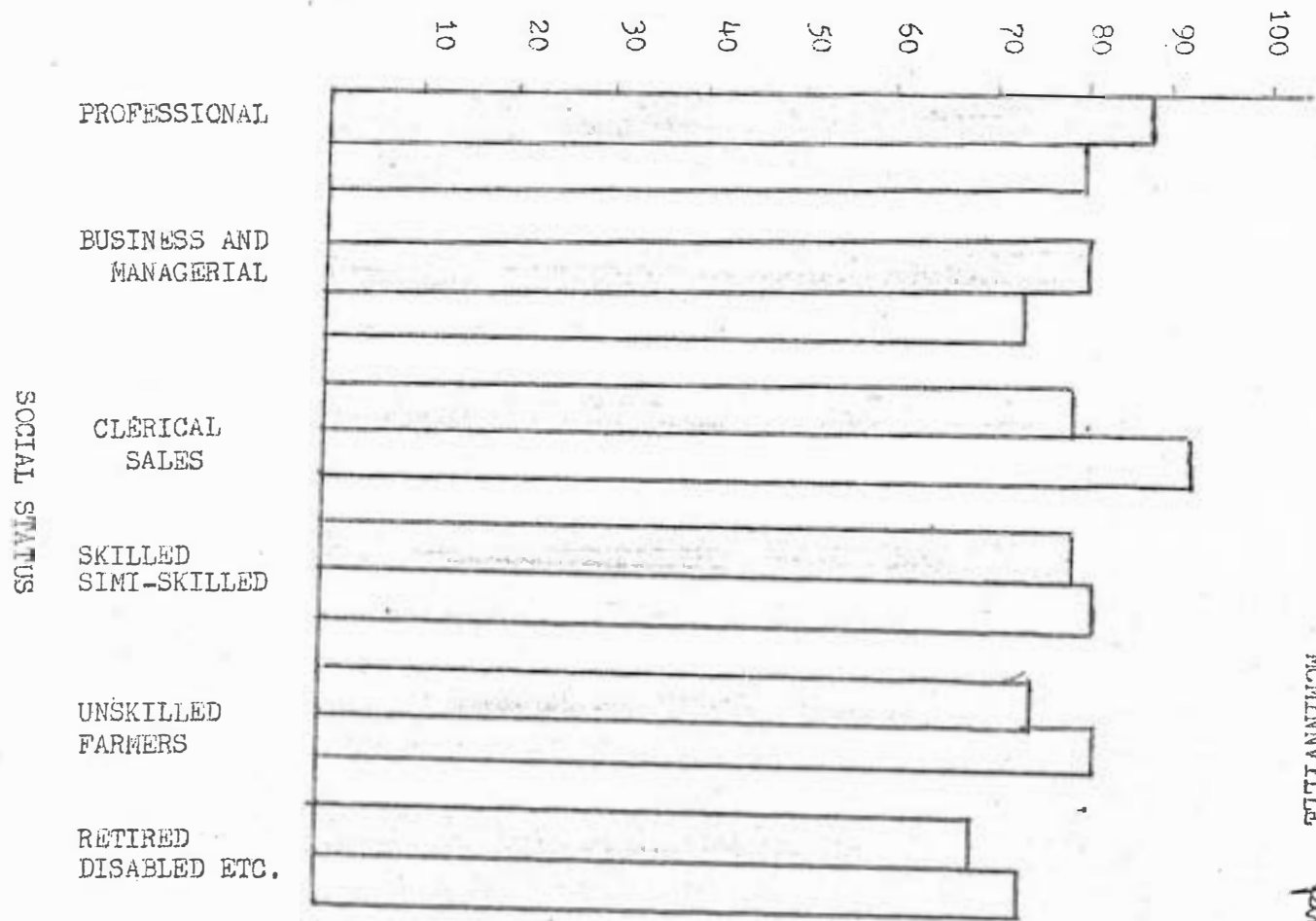
FOREST GROVE
 MCMINNVILLE
quarry
quarry

PERCENT OF CHILDREN WITH VISUAL EXAMINATION



FOREST GROVE
MC MINNVILLE
*quicker
punch*

PERCENT OF CHILDREN WITH VISUAL EXAMINATION



Question #5 Have you ever had a visual examination?

From this question we attempted to determine if there was a difference between the percentage of those who received visual exams in Forest Grove and McMinnville High Schools. We found that of those questioned in Forest Grove 79% had had visual exams compared to 82% of those questioned in McMinnville. In comparing these percentages the critical ratio was found to be .95735 which was below our initially established 5% level of confidence (1.96). Thus we must accept our null hypothesis that there was not a significant difference between these two communities in this respect.

Upon evaluating our findings with the 1957 findings for Forest Grove, we found that in 1957, 69% of the students had received visual exams compared to 79% in 1974. The critical ratio here was 2.83 which indicates that there is a significant difference between the two years.

Upon making a similar comparison for McMinnville we found that in 1957 82% of the students questioned had received visual exams compared to 77% in 1974. The critical ratio here was below our critical value of 1.96 (1.3265) indicating that there is not a significant difference between the two comparison years, in McMinnville.

Question #6

When was last visual examination?

This question was asked of those who had a visual examination in an attempt to determine its recency. Adams and Charbonneau divided these into two groups, those who had had a visual examination within the past two years, and those who had had a visual examination more than two years ago. They also assumed those with adequate visual care to be those that fell into the former group.¹ To stay consistent with their earlier work, we also have assumed the two year criterion for adequate visual care.

In comparing the two communities we found 64.2% of the students in Forest Grove had a visual examination within the last two years. Whereas, 68.5% of the students in McMinnville fell into the same group. These percentages gave us a critical ratio of 0.929 causing us to accept the null hypothesis that there was not a significant difference as to the recency of visual examinations.

We found that there was not a significant difference in the recency of visual care received in Forest Grove between 1957 and 1974 (critical ratio= 1.711). This same conclusion as to the recency of visual care between 1957 and 1974 was noted also in McMinnville (critical ratio = 0.730). Thus we can conclude that the adequacy of visual care of these two communities has remained constant in the last 15 years.

Questions #7 and #8

#7 Was last visual examination medical?

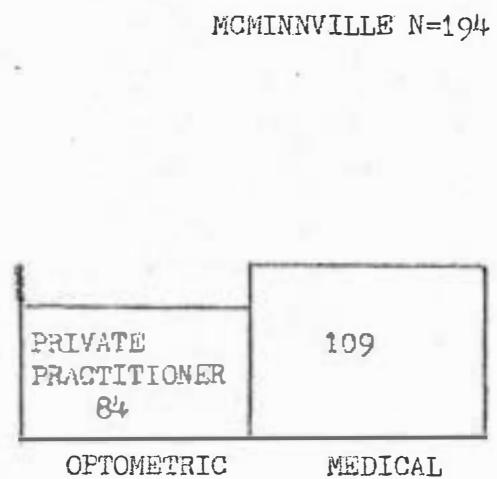
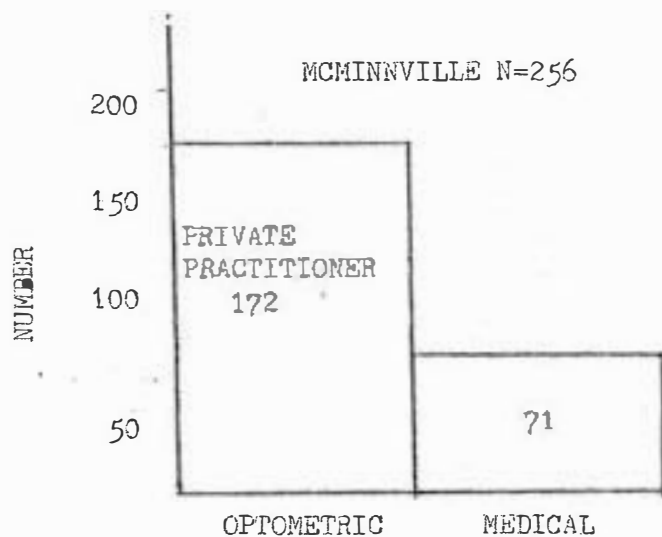
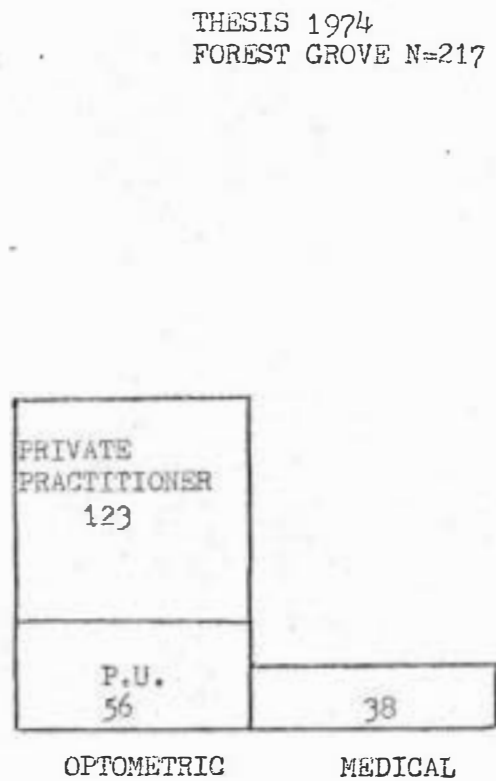
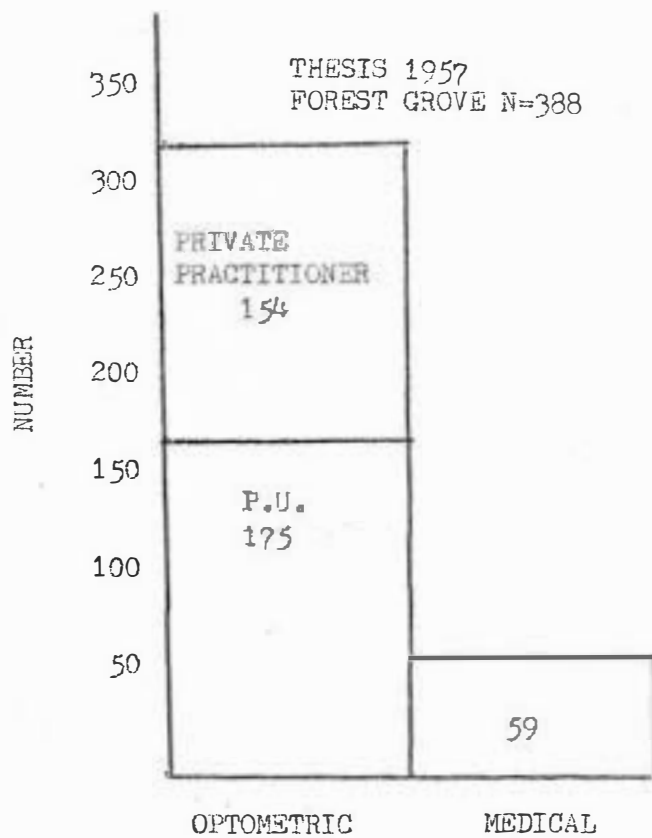
#8 Was last visual examination optometric?

Those students who answered yes to question #5 (Have you ever had a visual examination?) were separated into medical and optometric groups by questions #7 and #8 respectively. We found that of those questioned in Forest Grove 82% obtained optometric visual care. Whereas, in McMinnville 43% of those questioned sought out optometric visual care. In comparing these percentages, the critical ratio was found to be 8.16 which is well above our initially established 5% level of confidence (1.96). Thus we must reject our null hypothesis, and conclude that there was a significant difference between these two communities in this respect.

In 1957, we found that 84% of the students had received optometric visual exams in Forest Grove, compared to 82% in 1974. The critical ratio here was 0.698 which indicates that there is not a significant difference between the two comparison years.

Upon making a similar comparison for McMinnville we found that in 1957, 72% of the students questioned had received optometric visual care compared to 44% in 1974. The critical ratio here was found to be above our critical value of 1.96 (5.269) indicating that there is a significant difference between the two comparison years in the percentage of students obtaining optometric visual care.

GRAPH # 3
QUESTIONS 7-8-14



Questions #9 and #10

9. Are your glasses to be worn all the time?
10. Are your glasses for near work only?

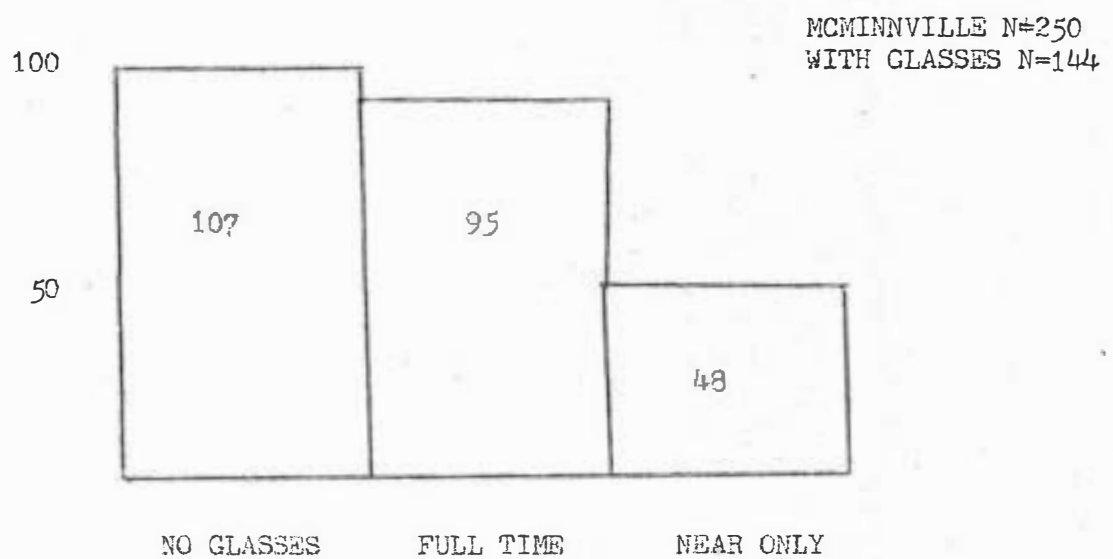
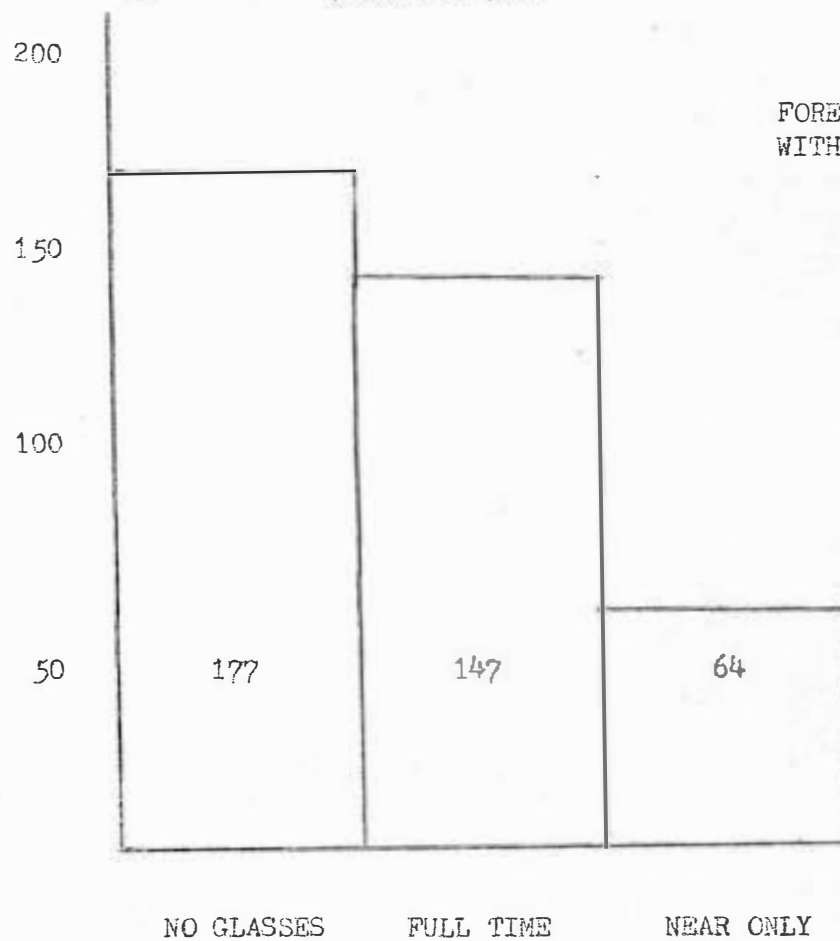
Those students who answered yes to question 5 (Have you ever had a visual examination?) and yes to either question #9 or #10 were separated from those students who had a visual examination with no glasses prescribed. Thus, we attempted to determine if there was a difference between those students of each community who had been prescribed an Rx and those who had not.

In Forest Grove 53% of the students who had visual examinations were prescribed some form of lenses. Whereas, in McMinnville 35% of the students who had visual examinations were prescribed some form of lenses. These percentages gave us a critical ratio of 6.076 causing us to reject the null hypothesis, thus concluding that this is a significant difference.

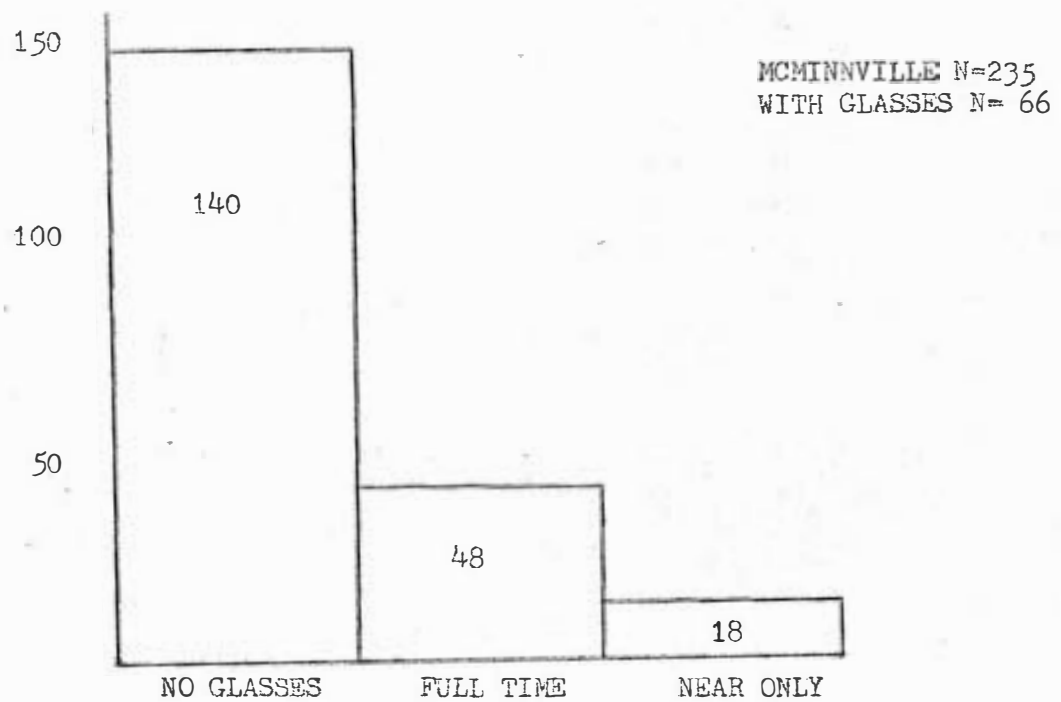
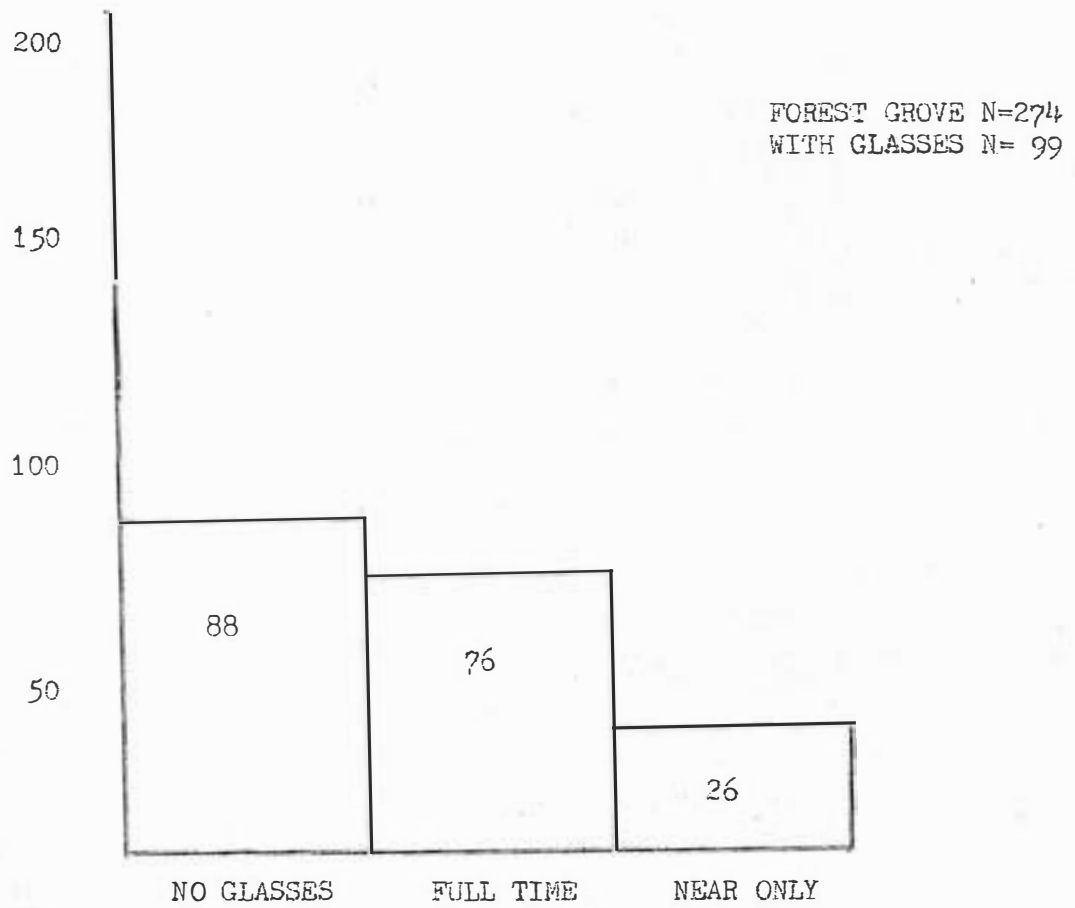
We found that there was not a significant difference in the percentage of lenses prescribed in Forest Grove between 1957 and 1974 (critical ratio = 1.207). On the other hand we did find a significant difference in the percentage of lenses prescribed in McMinnville between the comparison years. In 1957 55% of those students receiving visual examinations were prescribed lenses. In 1974 this percentage was found to be 32%, which is significant at the 5% level of confidence (critical ratio 4.385).

See graphs #4 and #5 for illustration.

QUESTIONS 9-10



· QUESTIONS 9-10



Question #11

Do you have bifocal lenses?

This question was included to ascertain whether certain optometric trends are developing in one community whereas they are not developing in another. It was found that in Forest Grove 21% of all lenses prescribed to those high school students questioned were in the form of bifocals. On the other hand in McMinnville 3% of all lenses prescribed to those students questioned, were in the form of bifocals.

Question #12

Have you ever had visual training?

In this question we wanted to establish what percentage of students in each community had obtained visual training. We found that of those questioned in Forest Grove 14.6% had obtained visual training, compared to 5.9% of those questioned in McMinnville. In comparing these percentages the critical ratio was found to be 3.155, causing us to reject our null hypothesis. Therefore, there is a significant difference in the amount of visual training received in these two communities.

In 1957, we found that 15.2% of the students had received visual training in Forest Grove, compared to 14.6% in 1974. The critical ratio here was 0.221 which indicates that there was not a significant difference between the two comparison years.

In McMinnville, no significant difference was found in the amount of visual training received between 1957 and 1974 (critical ratio = 1.468).

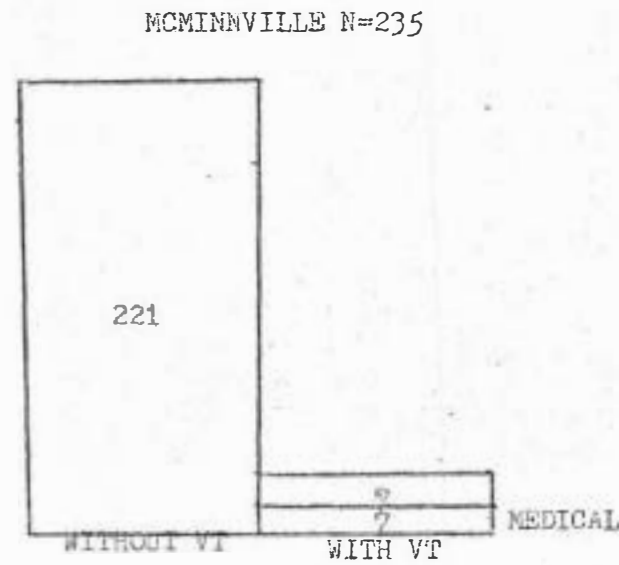
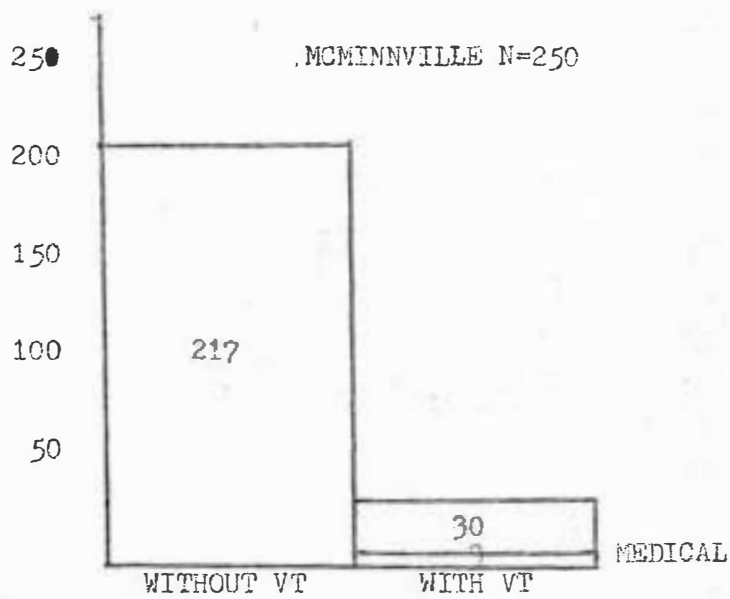
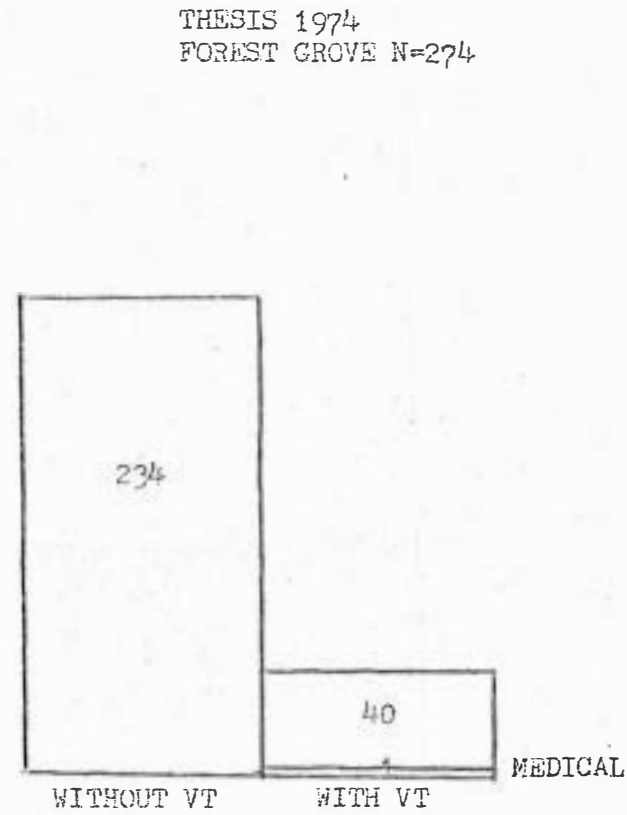
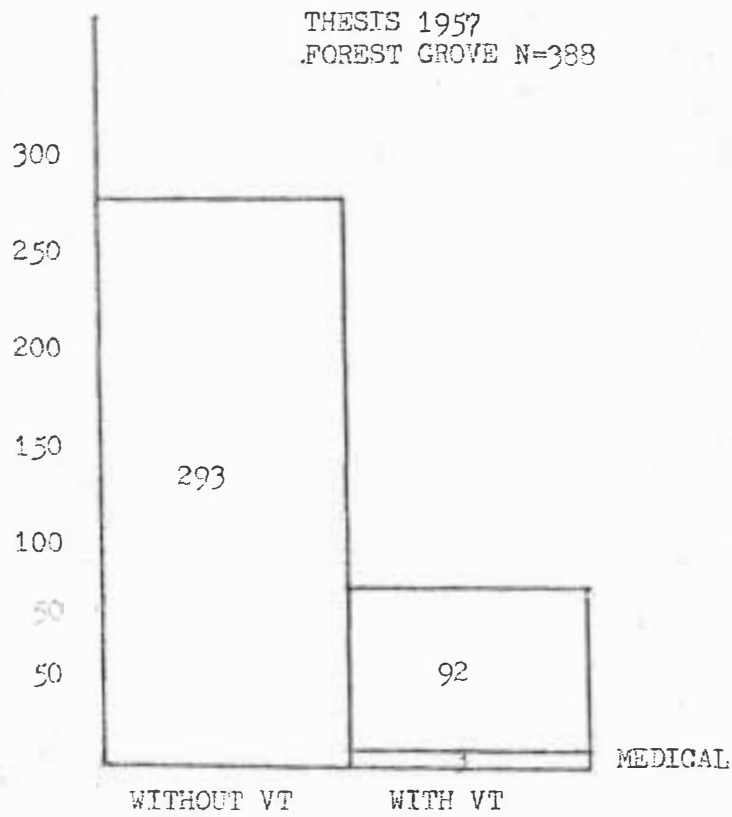
Questions #13 and #14

#13 Was the visual training optometric?

#14 Was the visual training medical?

An analysis of the data of these two questions shows us that there is significantly more optometric visual training in Forest Grove 97.5%, than medical visual training. On the other hand in McMinnville there is an equal amount of optometric and medical visual training 50%. Thus, there is a significant difference in regards to the percentage of optometric and medical visual training between the two communities (critical ratio = 4.30).

GRAPH # 6
QUESTIONS 12-13-14



Question #15

Was your visual care from the Pacific University
Optometric Clinic?

Question #15 was included in this study to determine the percent of the high school population in Forest Grove receiving visual care from the Pacific University Optometric Clinic as compared with private practitioners.¹ In 1957 Adams and Charbonneau found that of those who received optometric visual care, 45% were served at the Pacific University Clinic. In 1974 we found that of those who received optometric visual care 31% were served at the Pacific University Clinic. The critical ratio was found to be 3.64 causing us to reject the null hypothesis, therefore we must conclude that this is significantly different.

CONCLUSIONS

Throughout the first part of our study we have maintained that Forest Grove and McMinnville are comparable communities and on the basis of the null hypothesis we should not find a significant difference in any of the areas studied.¹ The null hypothesis was accepted in the following instances.

1. There was not a significant difference in the number of students receiving visual examinations in either community.
2. There was not a significant difference as to the recency of visual examinations.

The null hypothesis was rejected in the following instances.

1. Of those individuals who received medical visual care, McMinnville showed a significantly greater number than Forest Grove
2. Forest Grove shows a significantly greater ratio between the number receiving visual care and the number wearing glasses.
3. Forest Grove shows a significantly greater number of those receiving visual training.
4. Forest Grove shows a significantly greater number of those students who have been prescribed bifocals.

Throughout the second part of our study we have maintained that the visual care of each community has remained constant over a 15 year time span.

Forest Grove

The null hypothesis was accepted in the following instances.

1. There was not a significant difference in the recency of visual examinations.
2. There was not a significant difference in the percentage of those students receiving optometric visual care.

3. There was not a significant difference in the percentage of those students for whom lenses have been prescribed.
4. There was not a significant difference in the percentage of those students receiving visual training.

The null hypothesis was rejected in the following instances.

1. There are a significantly greater number of students receiving visual examinations in 1974.
2. There are a significantly fewer number of students receiving their visual care at the Pacific University Optometry Clinic in 1974.

McMinnville

The null hypothesis was rejected in the following instances.

1. There is a significant increase in the percentage of medical visual examinations performed in 1974.
2. There is a significant decrease in the percentage of lenses prescribed in 1974.
3. There is a significant increase in the percentage of medical visual training in 1974.

The null hypothesis was accepted in the following instances.

1. There is not a significant difference in the number of students receiving visual examinations.
2. There is not a significant difference in the recency of visual examinations.
3. There is not a significant difference in the amount of visual training received.

FOOTNOTES

- ¹Adams, Stanley C. and Charbonneau, Robert B., Comparative Study of Visual Care in Forest Grove and McMinnville High Schools, Optometry Thesis 1957.